IDT-Hub Control
Cross-platform User Manual
for Windows™ and MAC™ OS X™

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Software Release
1.00.03

Document Revision
February 2017

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1. Terms and Conditions

For more detailed information, see the "**Terms and Conditions**" as stated in the camera manual and the IDT web site.

2. System Overview

2.1. Supported platforms

Motion Inspector supports the following platforms:

- Microsoft Windows XP, Vista, 7, 8, 8.1 and 10 (32 and 64 bits).

- Apple MAC OS/X 10.8 (Mountain Lion), 10.9 (Mavericks), 10.10 (Yosemite) and 10.11 (El Capitan).

The cross-platform manual provides instructions on using Motion Inspector on the above platforms. The icons below denote differences in setup, procedures and commands between Windows and OS X.

3. IDT-Hub™ Control

The IDT-Hub Control allows the user to control one or more rack-hubs or mini-hubs. Once the program is started, the window below appears.

Edit Device Information

General options

Device Enumeration
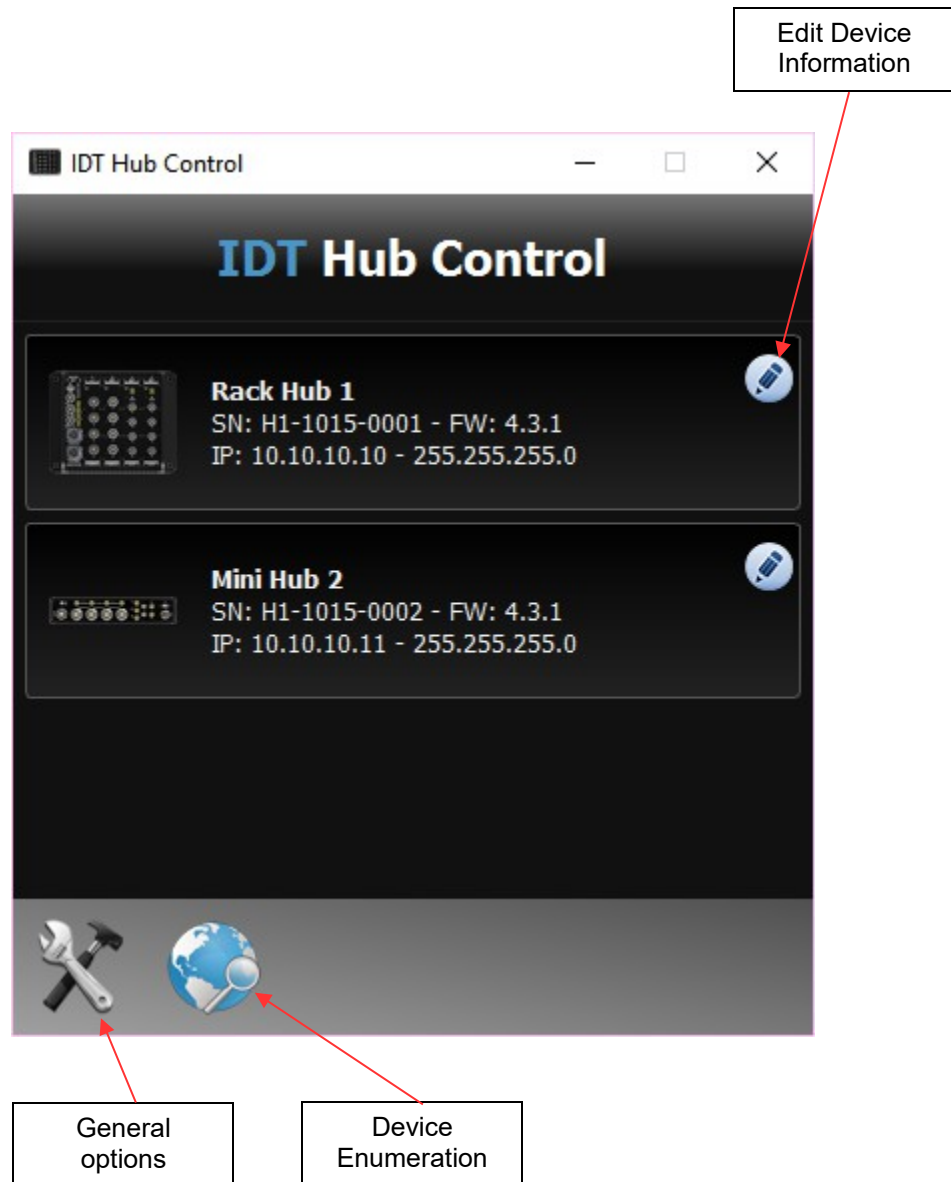
3.1. General options

Click the options button to open the dialog box below.
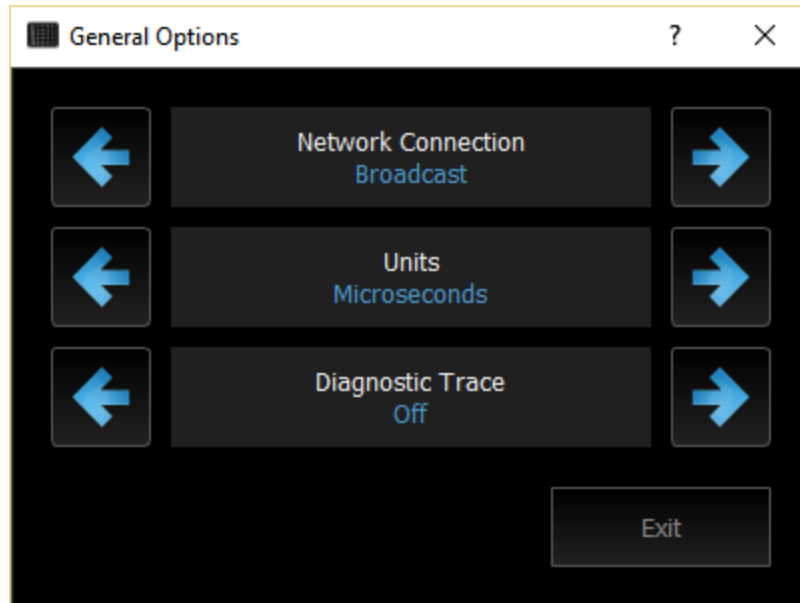
Network connection: select the network adapter connected to the device. If you select "Broadcast" the software will search for devices from each adapter in your computer.

Units: the timing data (pulse width and delay) may be displayed in microseconds or degrees (0 to 360 as percentage of the period).

Diagnostic trace: enable and disable the trace. The trace file (rm_trace.txt) is stored in your home directory.

3.2. Edit device information

If you press the "edit device info" button, the parameters below appear.

The user may edit the device name, the IP address and the sub-net mask.

3.3. Rack Hub Device operation

Every detected rack-hub is shown as a black button. A single click on the button opens the device window.
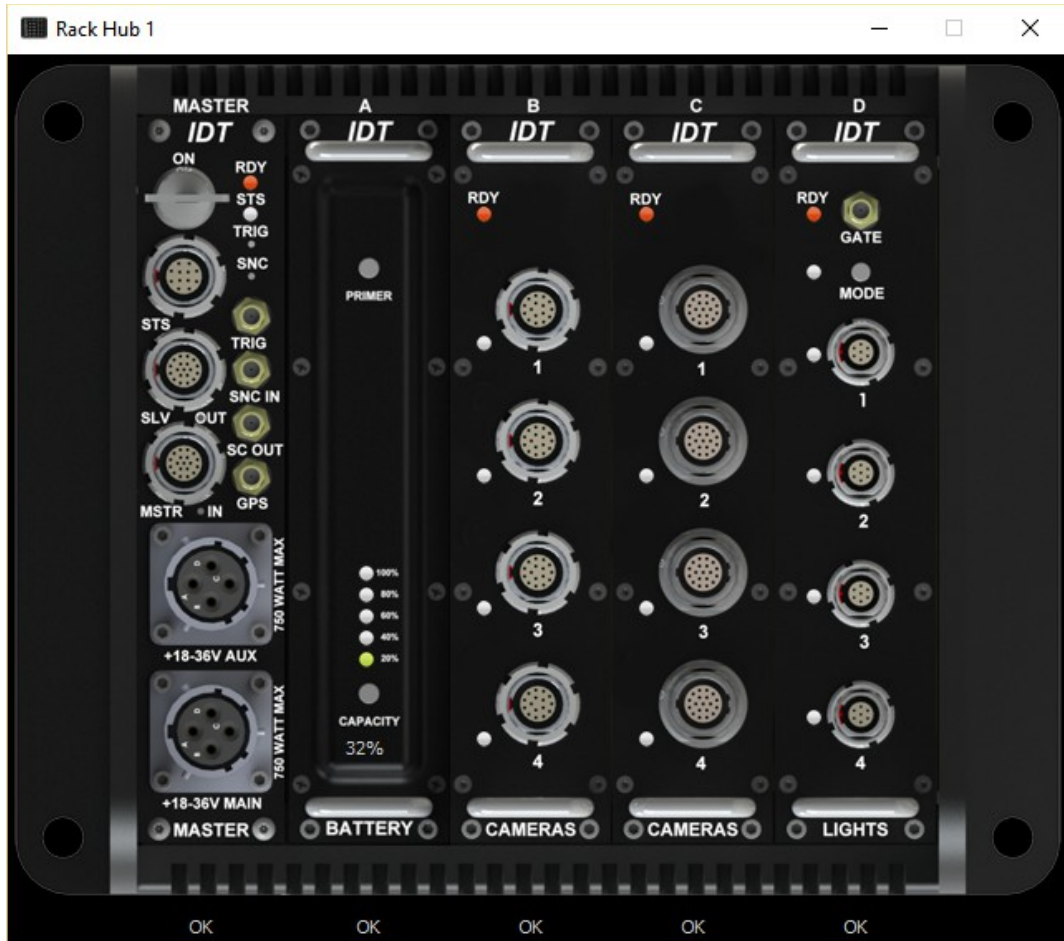
As shown in the illustration above, the 5-slot High G Rack Hub system has MASTER slot and four open slots to be configured with the following available modules (left to right):

Battery module.

Camera module for cameras with 16 pin LEMO connection (NR and Nx).

Camera module for cameras with 19 pin M-LEMO connection (iN, Nx-Air, Os, Os-Airborne, and Crash-Cam)

LED module for the VERITAS™ Crash LED's.

3.4. Rack-Hub Master (Base)

The MASTER module provides up to 1.5 KW of power conditioning capability, GPS antenna, IRIG, and 1 PPS inputs for synchronization and time stamping, IEEE-1588 (PTP) for time encoding over the network infrastructure, Gigabit network connectivity, real time status feedback of the complete system with its modules and a configurable shock sensor.

The Master/Slave connection pair provides not only the Gigabit network connectivity but is also a signal pass through for the DTS signal acquisition equipment. This feature is especially important when the High G Rack Hub is used in conjunction with the DTS equipment.

The MASTER module is the permanent module of the High G Rack Hub system and it is the host device for all other modules. As such it provides the required infrastructure for the seamless operation regardless of the final user configuration as follows:

- Power Management.

- Gigabit Network Connectivity with IEEE-1588 (PTP).

- GPS, IRIG, 1 PPS inputs.

- Real-time system status monitoring.

- Triggering, timing and synchronization configurations.

3.4.1. Sync In

The Sync In page configures the source of synchronization of the modules (cameras and LED).
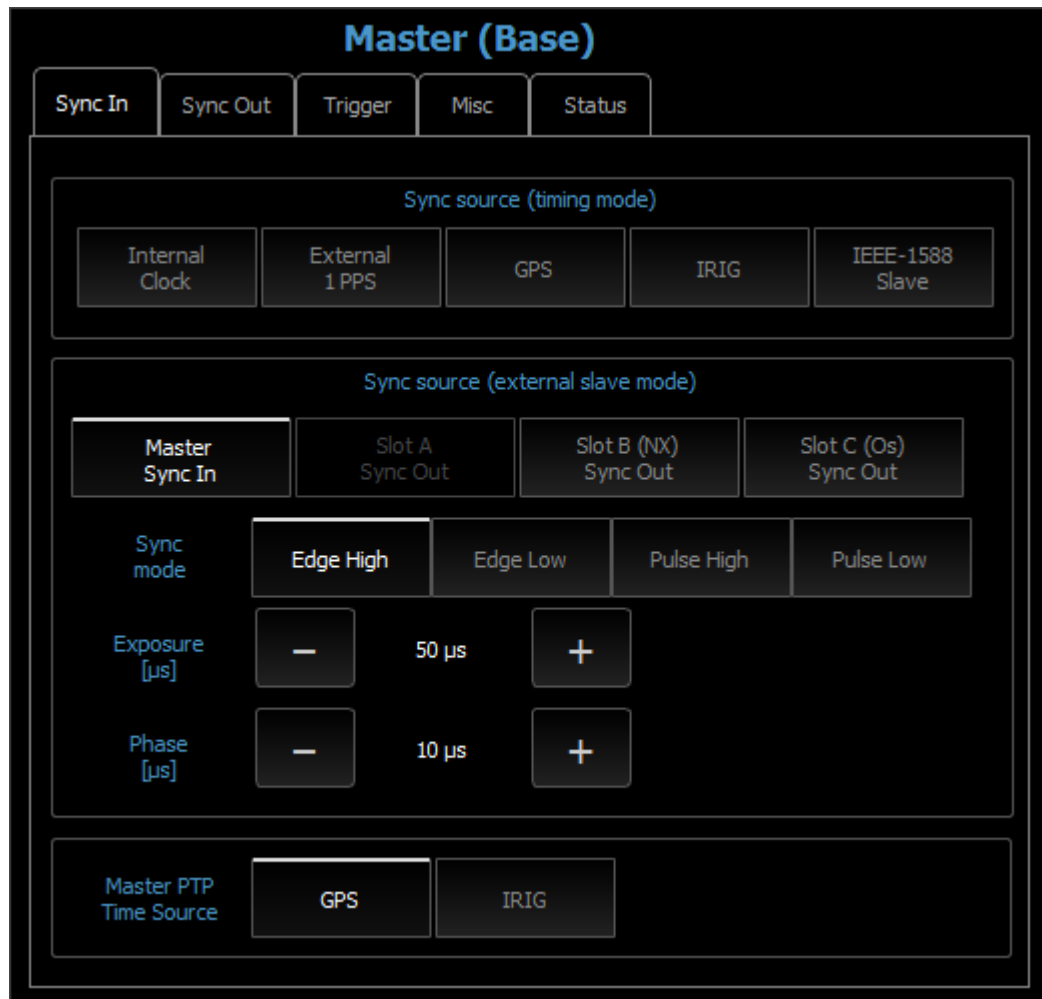
The selection of the sync in source is divided into two sections.

Sync source group 1 (timing mode)

The timing signals are generated by the internal clock and are aligned to the external sync source that provides a 1 PPS signal (except internal clock mode). The sync out, the camera modules timing and the LED timing can be independently configured.

Internal clock: the signals are internally generated.

External 1 PPS: the signals are internally generated and the reference input signal is a 1 Hz square wave with TTL levels.

GPS: the signals are internally generated and the reference input signal is retrieved by GPS through the GPS antenna.

IRIG: the signals are internally generated and the reference input signal is retrieved by IRIG through the connector #2 (see the rack hub setup guide).

IEEE-1588: the signals are internally generated and the reference signal is generated by an external PTP master through the Ethernet.

Sync source group 2 (slave mode)

The sync in signal is retrieved from an external source. The external signal frequency is used to synchronize the camera modules and the LED module.

The source of the signal may be:

Master Sync In: the "sync in" SMA connector of the master (base).

Slot A, Slot B, Slot C sync out: if a slot contains a camera module, the sync out of the cameras can be used as Sync In of the other camera/LED modules (master/slave). If a slot does not contain a camera module, the corresponding button is grayed out.

The signal taken from the "sync in" can be configured.

Edge-High, Edge-Low: the leading edge (or the falling edge) of the external signal is used to generate the sync signal. The pulse width (exposure) and the delay (phase) may be configured.

Pulse High, Pulse Low: the external sync signal frequency and pulse width are used to generate the sync signal. The delay (phase) of the signal may be configured.

3.4.2. Sync Out

This page controls the configuration of the master sync out. The sync out signal may be used to sync other devices, such as lights or data acquisition devices.

The status of the sync out signal depends on the configuration of the sync in.

Slaved: if the sync in is set to one of the external sync sources (master sync in, Slot A, Slot B or Slot C sync out) the sync out signal is automatically slaved to the sync in signal.

Configurable: if the sync in is set to one of the timing mode sources (internal, 1PPS, GPS, IRIG or IEEE-1588) the sync out signal is configurable. In this fashion, the frequency, exposure and phase can be modified.

3.4.3. Trigger

Motion trigger

If this option is on and one of the camera is triggered, the trigger is routed to all the cameras connected to the rack hub. This is useful when the camera is configured to get a motion trigger. When the motion condition is true, one camera triggers and the rack hub sends the trigger to all the other cameras without any external signal.

Impact trigger

The rack hub is equipped with an impact sensor that can be configured to backup the trigger in crash tests. If the backup trigger is enabled, the following parameters may be configured.

Threshold level: the minimum shock level that generates the trigger.

Duration: the maximum duration of the shock that generates the trigger.

The trigger occurs if the level is above the "threshold level" for an amount of time shorter than the "maximum duration".

3.4.4. Misc
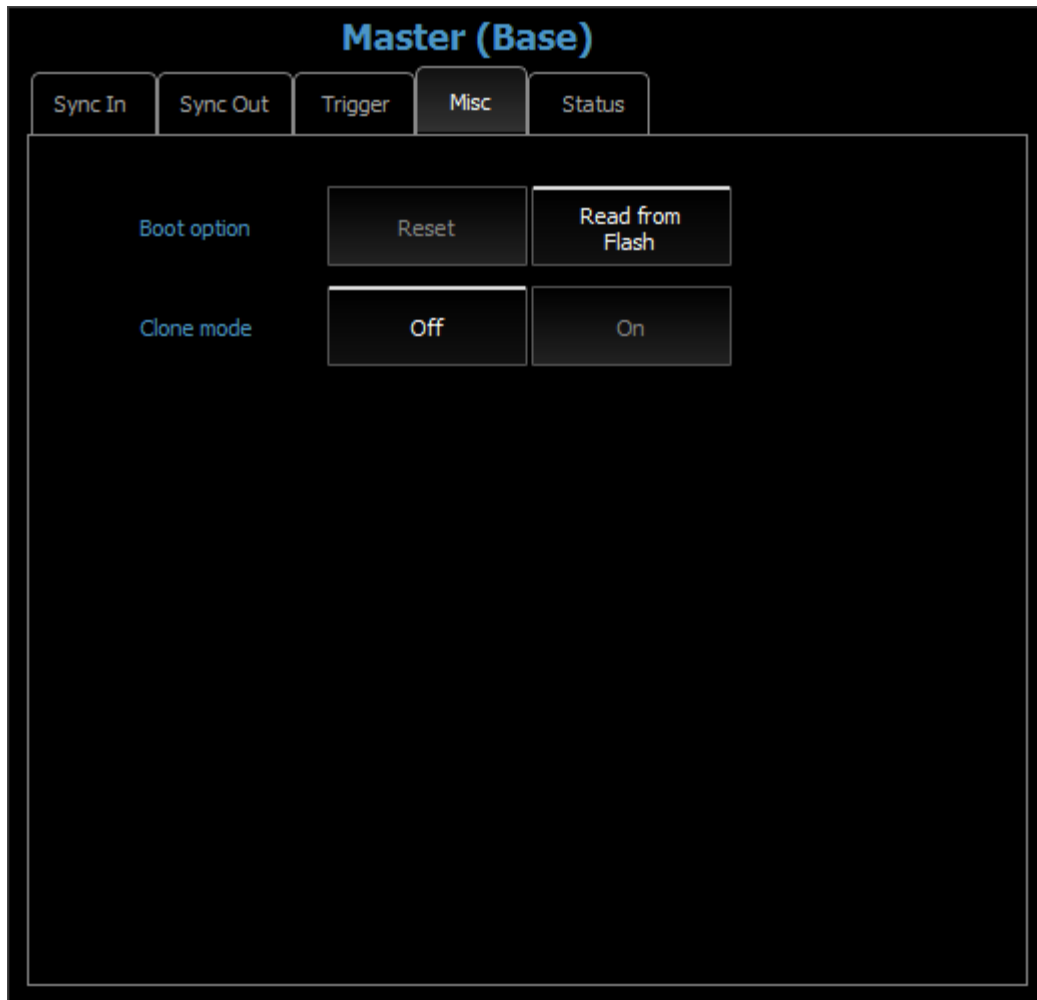
Boot option: the user may select which configuration the device loads after reboot. If the selection is reset, the configuration is reset. Otherwise the device loads from the flash memory the latest saved configuration.

Clone mode: if this option is on, each timing parameter (frequency, exposure or phase) that is modified on one of the modules (camera or LED) is automatically set the same channel of the other modules.

3.4.5. Status

The status of the battery may be displayed (see below).

Some of the parameters show some general information values.

Impact count: returns the number of times the impact sensor has been triggered.

PTP mode: the PTP can be configured as master or slave.

PTP IP address: if the rack hub as a master PTP, it has also an IP address and a sub-net mask.

3.5. Rack-Hub Battery module

The Battery module supports the autonomous operation without external sources. If you click on the module the dialog box below appears.
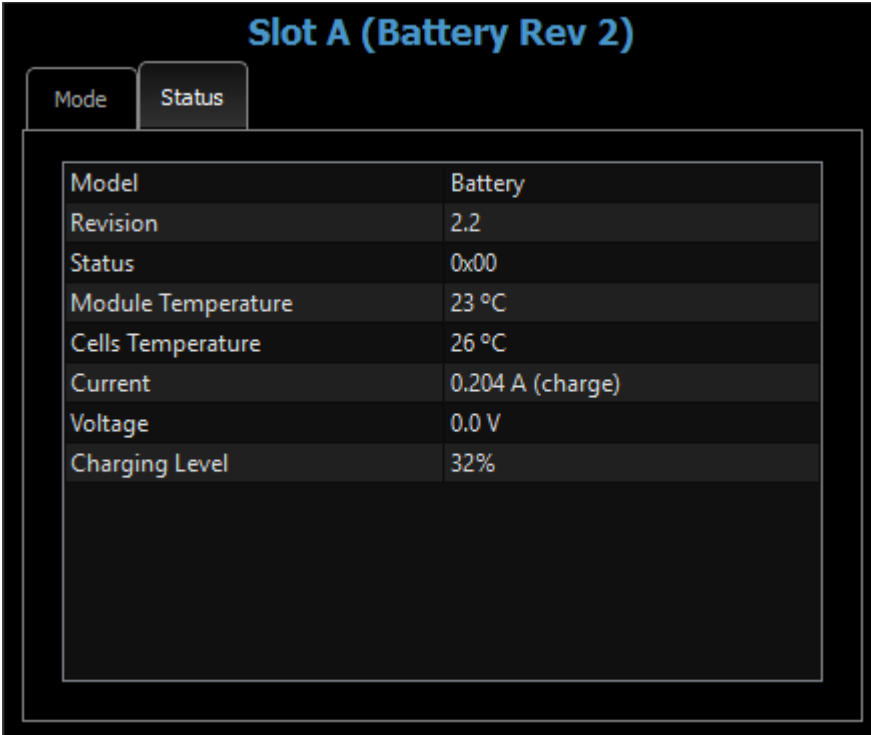
3.5.1. Operation mode

The battery mode can be configured into three modes:

○ **Off**: the battery is off.

○ **14 v backup**: the battery backups only the modules with 14 v power.

○ **14 v and 48 v backup**: the battery backups any module.
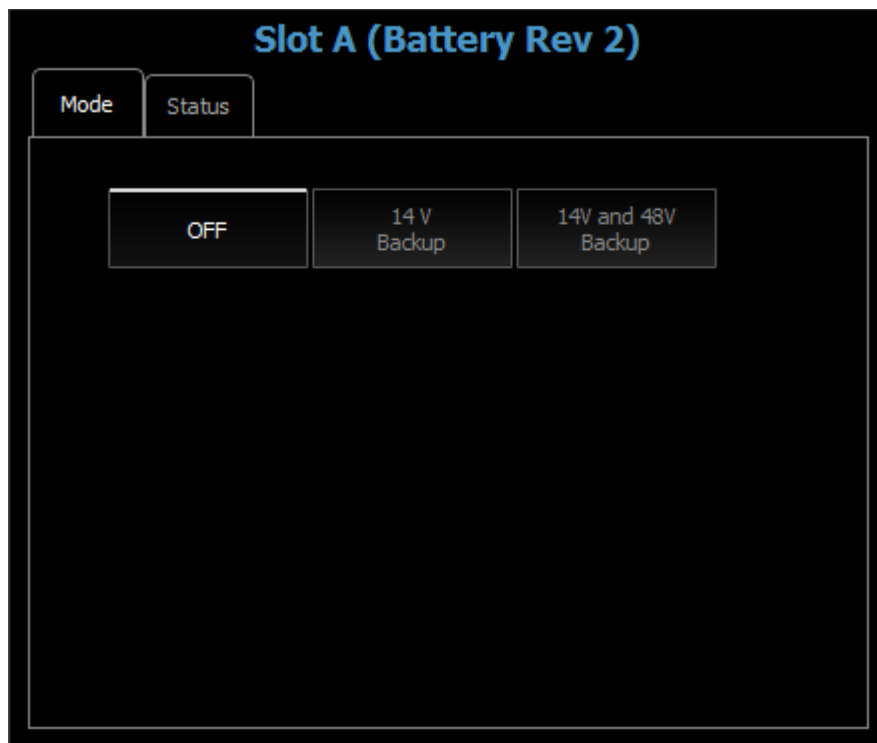
3.5.2. Status

The status of the battery may be displayed. The parameters are self-explanatory.

3.6. Rack Hub Camera module (16-pin and 19-pin LEMO)

The Camera modules (19-pin and 16-pin LEMO) support the operation of up to 4 cameras per module. The Camera modules allow for transparent mix or match of different camera models.

3.6.1. Timing configuration

Each camera frame period, exposure and phase may be independently configured. The camera timing can be configured only if the master sync in source is internal, external 1 PPS, GPS, IRIG or IEEE-1588 (PTP).
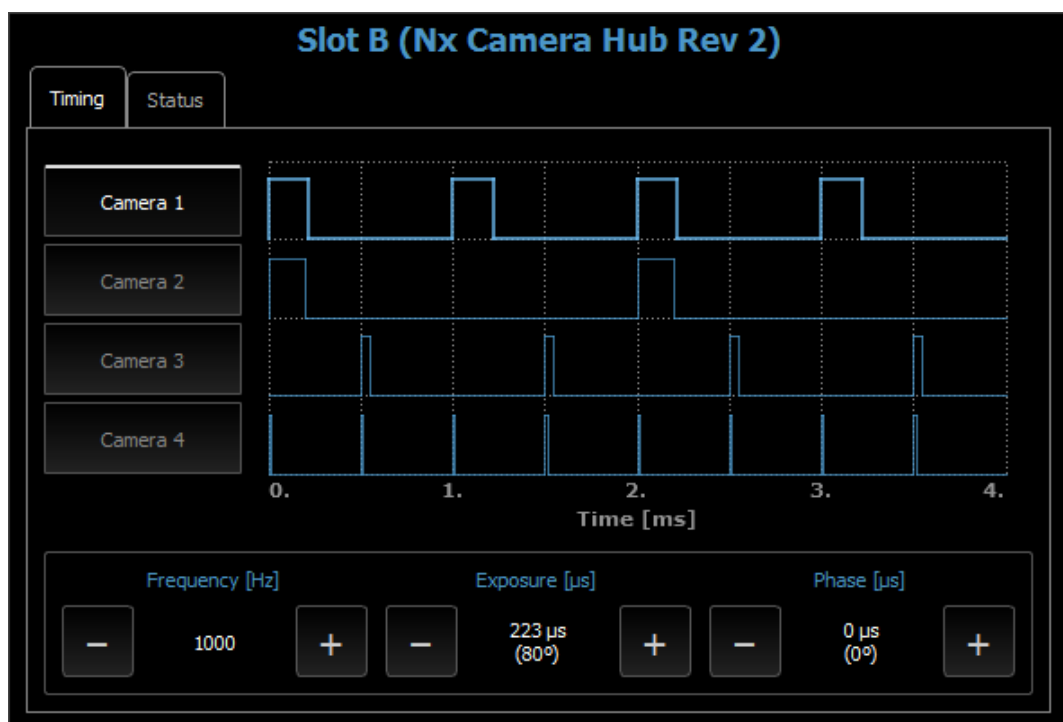
Click on the Camera buttons to select the camera, then edit the frequency, exposure and phase.
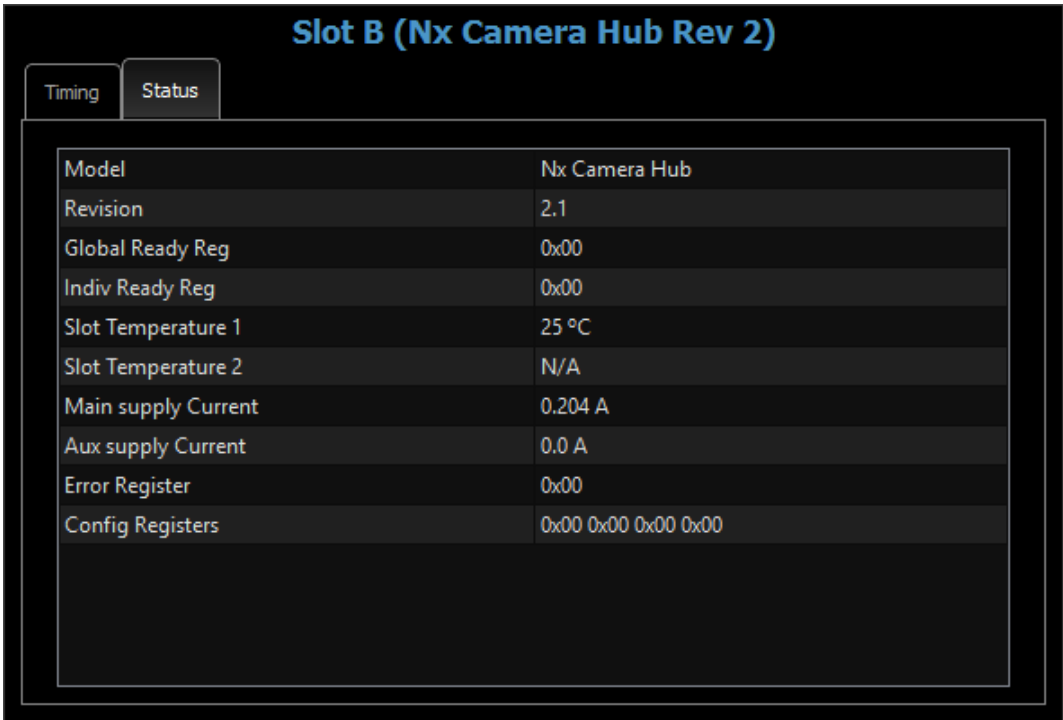
3.6.2. Touch Pad

Click or tap to one of the white labels (frequency, exposure or delay) to activate the touch pad and enter the values (see below).

3.6.3. Status

The status of the module may be displayed. The parameters are self-explanatory.

3.7. Rack-Hub LED module

The LED module supports the operation of up to 4 Crash-LED's each rated at 160W in continuous operation.

IMPORTANT: No more than one LED module can be assembled into the Rack Hub given its power supply limitations.

3.7.1. Timing mode

Each channels may be pulsed with an independent frequency, pulse width (exposure) and delay (phase). The timing can be configured only if the master sync in source is internal, external 1 PPS, GPS, IRIG or IEEE-1588 (PTP).
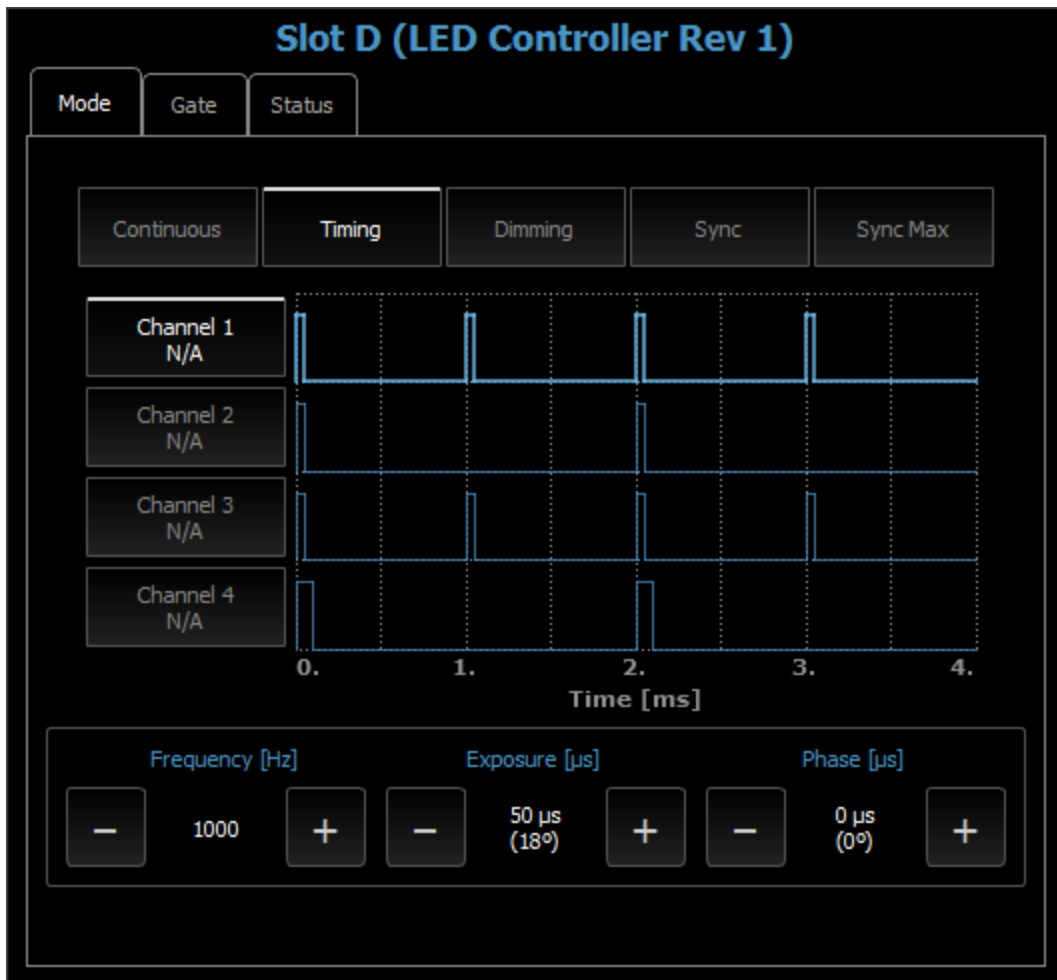
Click on the channel buttons to select the channel, then edit the frequency, exposure and phase.

3.7.2. Dimming mode

In dimming mode, the output signals are continuous. The user may control the intensity of each channel separately (with the sliders, the plus and minus buttons).
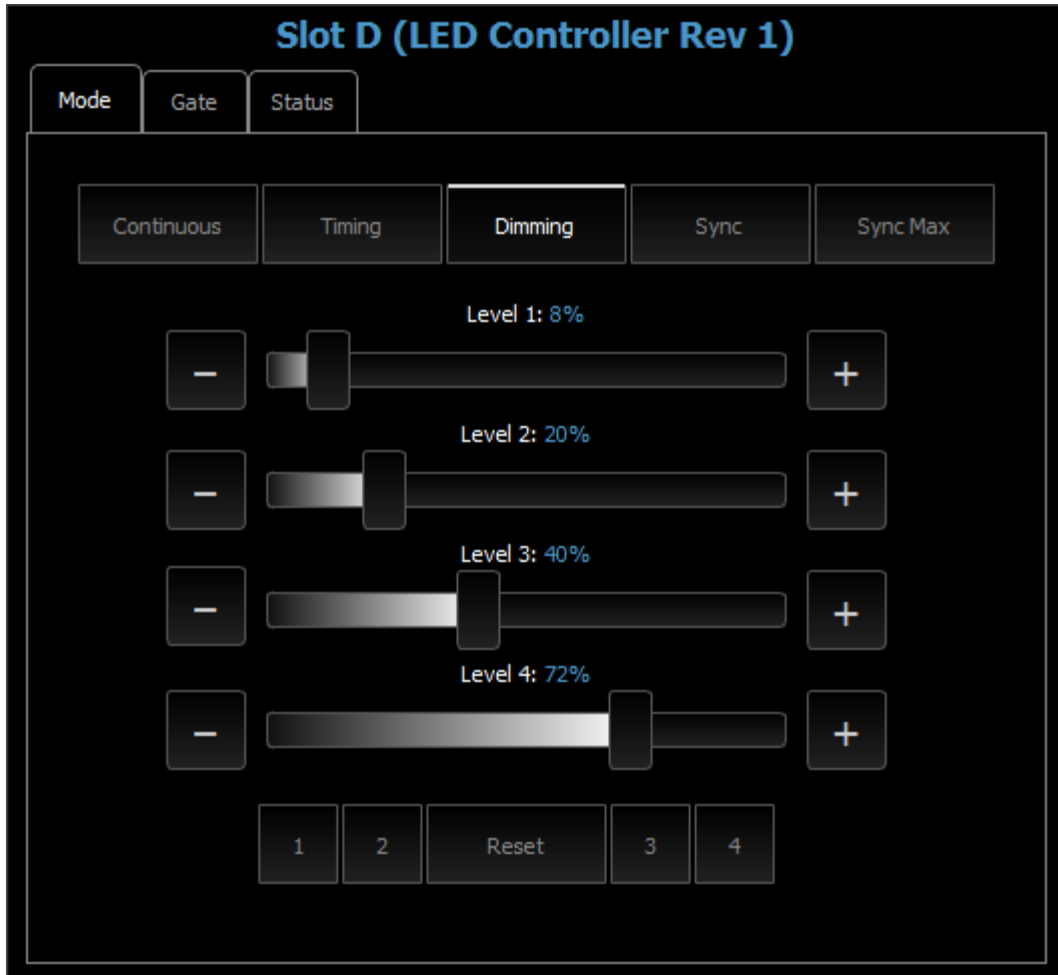
Each set of levels may be stored in a "preset" configuration (buttons with numbers 1, 2, 3,4).

To store a level configuration in a preset, press the button for more than 2 seconds until the message "Current levels saved to preset #N" appears.

To recall a preset, just click the corresponding button.

3.7.3. Other modes

Continuous: the light channels are continuously on at full power. The channels are not pulsed.

Sync: the light channels follow the Master base "sync in" signal. The base "sync in" source is set to Master sync in, Slot A, Slot B or Slot C sync out.

Sync Max: not implemented yet.

3.7.4. Gate

The light emission may be controlled with an external signal via the "Gate" SMA connector.

The "gate" mode may be:

OFF: the gate does not control the emission

On when the level is low: if the signal on the connector goes from high to low the lights are on. The lights are turned off when the signal goes back to high level.

On from level change: when the signal of the connector goes from high to low, the lights turn on and stay on for a number of seconds configured in the "Gate time" parameter. The maximum allowed number for the gate time is 1000.

3.7.5. Status

The status of the module may be displayed. The parameters are self-explanatory.

Slot D (LED Controller Rev 1)	
Mode **Gate** **Status**	
Model	Light Controller
Revision	1.1
Global Ready Reg	0x00
Indiv Ready Reg	0x00
Slot Temperature 1	25 ℃
Slot Temperature 2	N/A
Main supply Current	0.36 A
Aux supply Current	0.0 A
Error Register	0x00
Config Registers	0x08 0x00 0x00 0x00

3.8. Mini-Hub Device operation

Every detected mini-hub is shown as a black button. A single click on the button opens the device window.

The device includes a master module with support for four cameras and it may include top or bottom battery modules.

3.9. Mini-Hub Master (Base)

The MASTER module provides GPS antenna, IRIG, and 1 PPS inputs for synchronization and time stamping, IEEE-1588 (PTP) for time encoding over the network infrastructure, Gigabit network connectivity, real time status feedback of the complete system with its modules and a configurable shock sensor.

The Master/Slave connection pair provides not only Gigabit network connectivity.

The MASTER module is the host device for all other modules. As such it provides the required infrastructure for the seamless operation regardless of the final user configuration as follows:

- Power Management.

- Gigabit Network Connectivity with IEEE-1588 (PTP).

- GPS, IRIG, 1 PPS inputs.

- Real-time system status monitoring.

- Triggering, timing and synchronization configurations.

The configuration of the master parameters is equivalent to the rack-hub. See the "Master (Rack-Hub)" topic for more information.
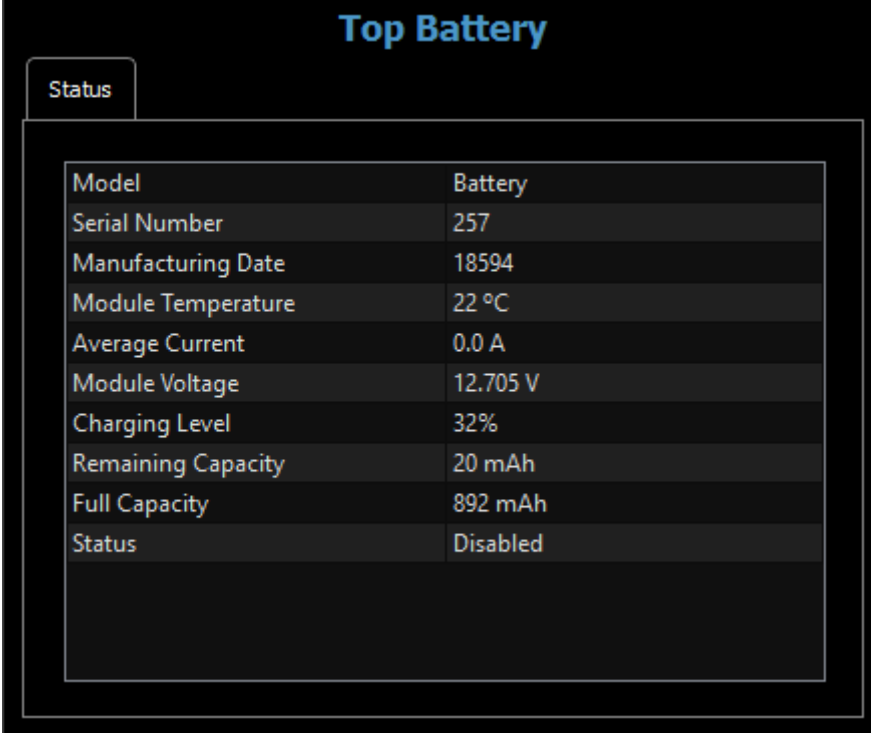
3.10. Mini-Hub Camera module

The mini-hub includes the support for four cameras and the sync out signals for additional lights.

The configuration of the camera module parameters is equivalent to the rack-hub. See the "Rack-Hub Camera module" topic for more information.

3.11. Mini-Hub Battery module

A top and a bottom additional battery modules can be connected to the mini-Hub. The battery module cannot configured, only the status can be displayed.